

REMARKS

In the above-identified Office Action Claims 1 and 17, the sole independent claims, were again rejected as being anticipated by the cited Hayes patent, while all of the claims were rejected as being obvious in view of various combinations of the cited prior art.

By this response previously added Claims 33-36 have been cancelled while independent Claims 1 and 17 have been amended to emphasize their patentable distinctions over the cited references.

Claims 1 and 17 provide that the reset switch and the transfer switch are turned on together at least in a predetermined period so that the charge on the photoelectric converter is reset, and that after an electric charge is again stored in the photoelectric converter and then transferred to the input terminal for an amplifier, the photoelectric converter is again reset.

Applicants respectfully submit that none of the cited references disclose such a claimed image pickup device. For example, the Hayes patent, which is the primary rejecting reference, discloses that $\phi T1$ and ϕFZ are simultaneously applied to turn on the transistors 26 and 36 in period A, and $\phi T2$ and ϕR are simultaneously applied to turn on the transistors 28 and 38 in period B, and those operations are carried out before the signal is readout during period E (see Fig. 3 of Hayes). Note that $\phi T1$ and $\phi T2$ are simultaneously applied to turn on the transistors 26 and 28 in the period D in order to connect the photodiode 14 and the amplifier 33 in Fig. 2. Accordingly, the operation of Hayes differs from that of the present invention. That is, in the period A, the potential VFZ is lowered to inject an electric charge to the photodiode 14, instead of performing the resetting operation of the present invention, so that the charge transfer efficiency of the transistor 26 can be enhanced to facilitate the charge transfer in the signal readout period. Then in the period B, $\phi T2$ and ϕR are simultaneously applied to the transistors 28 and 38

to inject the electric charge VR to the middle node 37 so that the charge transfer efficiency of the transistor 28 can be enhanced, after which, the reset charge is accumulated and applied to the middle node 37 in accordance with the high level of the second $\phi T2$ pulse. Hence, the photodiode is not reset in this period, unlike in the present invention.

Thus, as will be appreciated from the above-explanation, Hayes discloses a charge injection operation for enhancing the charge transfer efficiency for the transfer transistors 26 and 28 and a reset operation for the circuit (not the photodiode) before the signal readout operation. (See column 4, lines 28-59 of Hayes.)

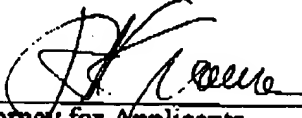
Referring now to the cited Guidash patent, a reset operation is disclosed for discharging the signal charge at the photodiode by turning on the transfer gate and reset gate together. However, it does not disclose accumulating a photoelectric charge in the photodiode and then carrying out again the reset operation after reading out the photoelectric charge. See column 4, line 47 stating that the operation is done once per frame. Further, it does not disclose simultaneously resetting the input section of an amplifier.

In the present invention, the transfer switch and the reset switch are turned on together for a certain period to reset the photodiode and the input terminal of the signal amplifier, and to carry out the same reset operation again after the signal readout operation. Due to this configuration, a residual electric charge remaining when the transfer switch is turned off after the readout operation can be removed prior to the initiation of the next signal readout operation. None of the references disclose or teach the above problem and solution.

For these reasons it is believed that the amended independent Claims 1 and 17 are allowable along with all of the depending claims. Accordingly, the issuance of a formal Notice of Allowance is solicited.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address given below.

Respectfully submitted,



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